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## Biodesulphurisation of benzothiophene and dibenzothiophene by *Rhodococci* isolated from oil contaminated soil

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Biodesulphurisation (BDS) is an emerging technology that utilizes microorganisms for the removal of sulphur from fossil fuels. In this research, two *rhodococci* that were previously isolated from oil contaminated soils in Russia were found to possess robust desulphurisation activity against benzothiophene (BT) and dibenzothiophene (DBT) respectively. One strain was able to convert DBT to hydroxybiphenyl (2-HBP) with DBTO and DBTO<sub>2</sub> as intermediates, whereas the other strain was able to convert BT into benzofuran, indicating that BDS reaction followed the well-known 4S pathway of desulphurisation. The species identity of the BT desulphurising strain and DBT desulphurising strain was confirmed as *R. opacus* and *R. erythropolis* respectively by 16S rRNA and *gyrB* gene sequence analysis and by whole genome sequence based OrthoANIu values (>95%). The DBT desulphurisation genes (*dsz*) of the *R. erythropolis* strain occurred as cluster sharing high similarity with the *dsz* operon of *R. erythropolis* IGTS8. The putative genes encoding the BT desulphurisation activity of the *R. opacus* strain was identified using comparative genomics. When cultured directly in a biphasic growth medium containing 10% model oil (hexadecane) or diesel containing 300 ppm sulphur, the *R. erythropolis* culture formed into an emulsion by interacting with the oil making it unsuitable for direct industrial application despite its desulphurisation potential. Whereas, the *R. opacus* culture formed distinct oil, biomass and aqueous phases which enabled easy extraction of the desulphurised oil with 80 fold reduced sulphur level, as measured by inductively coupled plasma - optical emission spectrometry (ICP-OES), making it a desirable strain for commercial application.

### Biography

Selva M Athi Narayanan is a PhD student at the Edinburgh Napier University, UK. He has worked on applied microbiology research projects including bacterial biodesulphurisation, peptide antibiotic producing bacteria for several years and has co-authored two papers in reputed journals during the time.

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